Texas Instruments

PMP4320A Test Report

China Power Reference Design

REVA

03/03/2014
1 General

1.1 PURPOSE
Provide the detailed data for evaluating and verifying the PMP4320A. The PMP4320A is a single output DC-DC converter with standard half-brick outline and full digital controlling configuration (UCD3138). It could deliver 50A output current with 12V output voltage. The converter could provide high efficiency and good performance, which makes it an ideal choice for bus converter. For testing applications, a heat sink and sufficient airflow cooling is required.

1.2 REFERENCE DOCUMENTATION
Schematics: PMP4320A_SCH_Final.pdf
PCB Layout: PMP4320A_PCB_Final.pdf

1.3 TEST EQUIPMENTS
Multi-meter: Fluke 187
DC Source: LAMBDA
E-Load: Chroma 6314A
Ambient Temperature at 25DegC

1.3 TEST Setup Photos
Top side of the PMP4320A
Input Ripple & Output Ripple & Noise Test Configuration

Testing Setup Photos
## 2 INPUT & OUTPUT CHARACTERISTICS

### 2.1 Efficiency & Regulation

<table>
<thead>
<tr>
<th>Vin (V)</th>
<th>Iin (A)</th>
<th>Vout (V)</th>
<th>Iout (A)</th>
<th>Eff. (%)</th>
<th>Pass/Fail</th>
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<th>Vin (V)</th>
<th>Iin (A)</th>
<th>Vout (V)</th>
<th>Iout (A)</th>
<th>Eff. (%)</th>
<th>Pass/Fail</th>
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<th>Vout (V)</th>
<th>Iout (A)</th>
<th>Eff. (%)</th>
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2.2 Ripple & Noise

48V Input with No Load (12V/0A)

48V Input with 15A Load (12V/15A)
48V Input with Half Load (12V/25A)

48V Input with Full Load (12V/50A)
2.3 Input Reflected Current

Test point is between the DC Power Supply and the input capacitors.
2.4 Dynamic Load

Dynamic response for 25% step Load (50% <--> 75%), slew rate: 1A/us
CH1: Output Voltage        CH2: Output Step Current

Dynamic response for 25% step Load (50% <--> 75%), slew rate: 1A/us
CH1: Output Voltage        CH2: Output Step Current
### 2.5 Start-up Curve

#### Start-up with No Load (12V/0A)
- CH1: Output Voltage
- CH2: Output Current
- Graph showing the start-up curve with no load.
- Data table:
  - Voltage:
    - Average: 12.2 V
    - Minimum: 12.0 V
    - Maximum: 12.2 V
  - Current:
    - Average: 12.8 A
    - Minimum: 12.7 A
    - Maximum: 12.9 A
  - Rise Time:
    - Minimum: 170.1 ms
    - Maximum: 181.3 ms

#### Start-up with Load (12V/15A)
- CH1: Output Voltage
- CH2: Output Current
- Graph showing the start-up curve with load.
- Data table:
  - Voltage:
    - Average: 12.2 V
    - Minimum: 12.0 V
    - Maximum: 12.2 V
  - Current:
    - Average: 12.8 A
    - Minimum: 12.7 A
    - Maximum: 12.9 A
  - Rise Time:
    - Minimum: 167.3 ms
    - Maximum: 181.3 ms
Start-up with Load (12V/25A)
CH1: Output Voltage       CH2: Output Current

Start-up with Load (12V/50A)
CH1: Output Voltage       CH2: Output Current
2.6   Key Components Stress (48V Input)

Primary Mosfet Vds

Primary Mosfet Vds with Half Load (12V/25A)

Primary Mosfet Vds with Full Load (12V/50A)
Secondary Mosfet Vds & Driver Signal

Secondary Mosfet Vds & Driver with Half Load (12V/25A)

Secondary Mosfet Vds & Driver with Full Load (12V/50A)
2.7 Protection (48V Input)

Input UVP

Input UVP, UVP set point is 33V
CH1: Input Voltage 10.0V/Div
CH2: Output Voltage 2.0V/Div

Output OCP (Hiccup Mode)

Output OCP
CH1: Input Voltage 10.0V/Div
CH2: Output Voltage 2.0V/Div
Output OVP (Hiccup Mode)

Trim the divider resistor to reach the OVP point.

CH1: Input Voltage 10.0V/Div  CH2: Output Voltage 2.0V/Div

Output OVP, OVP set point is 14V.
2.8 Thermal IR Scan

TOP Side IR Scan at Full Load (12V/50A), 48V Input
With Fan Cooling

TOP Side IR Scan at Full Load (12V/50A), 60V Input
With Fan Cooling
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